

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
26 May 2005 (26.05.2005)

PCT

(10) International Publication Number
WO 2005/047908 A1

(51) International Patent Classification⁷: **G01P 5/22**

(21) International Application Number:
PCT/CA2004/001971

(22) International Filing Date:
16 November 2004 (16.11.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
2,449,551 17 November 2003 (17.11.2003) CA

(71) Applicant (for all designated States except US): **PHOTON
CONTROL INC.** [CA/CA]; 8540 Baxter Place, Burnaby,
British Columbia V5A 4T8 (CA).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **MELNYK, Ivan**
[CA/CA]; 604 Cottonwood Avenue, Coquitlam, British
Columbia V3J 2S4 (CA).

(74) Agents: **MCGRUDER, David, J. et al.**; Oyen Wiggs
Green & Mutala, 480 - 601 West Cordova Street, Vancou-
ver, British Columbia V6B 1G1 (CA).

(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,
ZW.

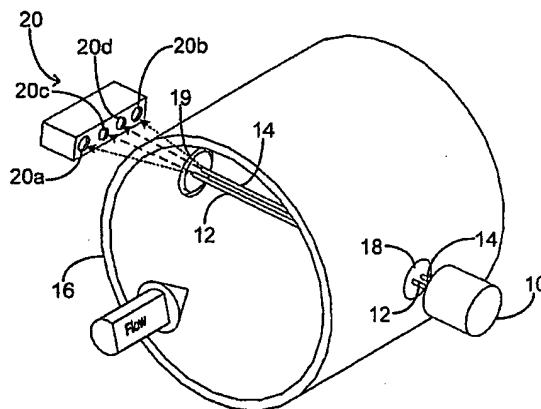
(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,
ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,
FR, GB, GR, HU, IE, IS, IT, LU, MC, NL, PL, PT, RO, SI,
SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,
GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

[Continued on next page]

(54) Title: **OPTICAL DEVICE AND METHOD FOR SENSING MULTIPHASE FLOW**



(57) Abstract: The invention provides a method for measuring the velocity of a multiphase fluid flowing in a pipe. The method comprises directing at least two collimated beams of light from an illuminator through the multiphase fluid by means of transparent portions of the pipe, the at least two collimated beams spaced apart in a direction of flow of the multiphase fluid by a predetermined distance; detecting scattered, deflected and attenuated light with at least two photodetectors to produce at least two signals, the at least two photodetectors associated with the at least two collimated beams; calculating a cross-correlation function between the at least two signals to determine a time delay between the signals; and, calculating the average velocity of the multiphase fluid by taking the ratio of the predetermined distance to the time delay.

WO 2005/047908 A1



— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.